

Application No. 10/575,388
Reply to Final Office Action dated 08/16/2011

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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An input device of an electronic combination lock, comprising:
 - a signal device for producing combination input information and for converting said information into two groups of electrical pulse signals, ~~said signal device including a coder;~~
 - a measurement and control device connected to said signal device for measuring the electrical pulse signals outputted from the signal device, deciding the order of the electrical pulse signals and calculating correspondingly such that said signals are converted into character sequences including the combination elements, and deciding whether said current combination elements are confirmed to be inputted or not and deciding whether the input of all the combination elements is completed or not;
 - a confirmation device connected with said measurement and control device and used for producing a conformation signal for inputting the combination elements to indicate that the input of the current combination element is confirmed; and
 - a display device connected with said measurement and control device for displaying said character sequences and for displaying prefabricated prompt information in a rolling and refreshing manner by the driving of said measurement and control device,wherein said confirmation device is a switch device, an electrical signal produced when it is closed allows said measurement and control device to confirm the current combination ~~current combination~~ element displayed by said display device as a part of a final input combination, said signal device comprises:
 - a panel body,
 - a rotatable dial installed on said panel body,
 - a drive shaft located at a center of said dial,
 - a set of driving gears installed on said drive shaft,
 - a driven gear engaged with said driving gears, and
 - a rotating coder coupled with said driven gear on the drive shaft,

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wherein said measurement and control device is a programmed microcontroller; said display device is an information display screen; and said switch device is a photoelectric switch, and

wherein said programmed microcontroller, said coder, said information display screen and said photoelectric switch are provided on a same circuit board, said circuit board is provided within said panel body, and said microcontroller is connected electrically with said coder, said information display screen and said photoelectric switch, respectively.

2. (Canceled)

3. (Previously Presented) The input device of the electronic combination lock as described in Claim 1, wherein said measurement and control device is also used for deciding whether during a given timing period which starts each time when a signal is produced by said confirmation device, the timing period expires or not, and if the timing period expires, then it decides that the input is during overtime.

4. (Previously Presented) The input device of the electronic combination lock as described in Claim 1, wherein the preset information displayed by said display device is indicated by symbols, wherein the close and open states of the lock are indicated by a symbol having a padlock shape, the time at which the lock is opened on time or is delayed to be opened is indicated by a symbol having a clock shape, the code setting state is indicated by a symbol having a key shape, and low power of battery is indicated by a symbol having a battery shape, and the confirmation states of the respective parts of the combination are indicated in turn by the remaining dot symbols.

5. (Canceled)

6. (Currently Amended) The input device of the electronic combination lock as described in Claim [[5]] 1, wherein the outer edge of said dial is a circular skirt-like fringe, the position of said photoelectric switch corresponds to the skirt-like fringe of said dial, when said dial is

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depressed, the light transmitted to the photoelectric switch is blocked by said skirt-like fringe, thereby a signal is produced by said photoelectric switch.

7. (Currently Amended) The input device of the electronic combination lock as described in Claim [[5]] 1, wherein the upper part and lower part of said panel body are hunched to be ear-edge shaped, and said panel body further comprises:

grooves provided in back of said ear edge and matched with the fingers;

a display window, the shape and size of which matches with the shape and size of said information display screen, and which forms an oblique angle together with said information display screen for viewing effectively the displayed information; and

a guiding hole provided at the display window side of said panel body for inserting an emergency key.

8. (Currently Amended) The input device of the electronic combination lock as described in Claim [[5]] 1, wherein it further comprises a reset spring installed within an internal axial hole provided on said drive shaft of said dial.

9. (Currently Amended) The input device of the electronic combination lock as described in Claim [[5]] 1, wherein a concentric circle plane gullet is provided on the internal end face of each of said set of driving gears, and a blind hole is provided on said plane gullet at a position corresponding to said panel body, and a steel ball and a spring are installed in said blind hole, said steel ball contacts and matches with the concentric circle plane gullet of said driving gear under the action of the spring.

10. (Currently Amended) An [[The]] input device of an [[the]] electronic combination lock as described in Claim 1, comprising:

a signal device for producing combination input information and for converting said information into two groups of electrical pulse signals;

a measurement and control device connected to said signal device for measuring the electrical pulse signals outputted from the signal device, deciding the order of the electrical pulse signals and calculating correspondingly such that said signals are converted into character sequences including the combination elements, and deciding whether said current combination

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elements are confirmed to be inputted or not and deciding whether the input of all the combination elements is completed or not;

a confirmation device connected with said measurement and control device and used for producing a conformation signal for inputting the combination elements to indicate that the input of the current combination element is confirmed; and

a display device connected with said measurement and control device for displaying said character sequences and for displaying prefabricated prompt information in a rolling and refreshing manner by the driving of said measurement and control device, wherein said confirmation device is a switch device, an electric signal produced when it is closed allows said measurement and control device to confirm the current combination element displayed by said display device as a part of the input combination, wherein,

the signal device is a roller device, comprising it further comprises: a roller, a coder coaxial with the roller, and an elastic bracket for supporting said roller, wherein the coder is coaxial with the roller;

said measurement and control device is a programmed microcontroller;

said display device is an information display screen;

said switch device is a microswitch provided below the shaft extension of the roller,

wherein said microcontroller is connected electrically with said coder, information display screen and microswitch respectively.

11. (Previously Presented) The input device of the electronic combination lock as described in Claim 10, wherein,

said information display screen is used for displaying 1-bit or 2-bit number in a circularly rolling manner of an ascending order or descending order according to the direction and angle of the rotation of said roller;

said microswitch is used for that when the roller is depressed, the microswitch is actuated by the shaft extension of said roller, thereby the rolling display of said information display screen is stopped, so that the number displayed currently is confirmed as a part of the combination; and

said elastic bracket is used for resetting said roller after releasing the depressed roller.

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12. (Previously Presented) A handle of a combination lock, wherein said handle is hollow and comprises:

an input device of the electronic combination lock as described in Claim 10, which is fixed within a cavity of said handle;

a first window provided on the surface of said handle, the first window corresponds to said roller may be dialed and depressed,;

a second window provided on the surface of the handle, the second window corresponds to said information display screen thereby the contents displayed may be viewed,; and

a rotation shaft fixed within the handle with a hole used for the wires to be passed through provided therein,

wherein the input device of the electronic combination lock is connected with a combination identification device of the combination lock and a power supply which are installed inside the core mechanism of the lock or installed at other position inside the door via the wires.

13. (Previously Presented) A handle of a combination lock, wherein said handle is hollow and comprises:

a handle body comprises a rotation shaft fixed therein, and a hole provided inside said rotation shaft for allowing the connection wires to be passed through;

a panel, the input device of the electronic combination lock as described in Claim 10 is installed inside the panel, a first window, which corresponds to said roller thereby said roller may be dialed and depressed, and a second window, which corresponds to said information display screen thereby the contents displayed may be viewed, are provided on said panel; and

a transparent window cover provided on a plane on which there is said second window,

wherein a hollowed region, which has the size and shape matching with that of said panel, is provided on the front surface of the handle body, thereby said panel can be embedded therein, and

said handle of the combination lock is connected with a combination identification device and a power supply of the combination lock, which are installed inside the core mechanism of the lock or installed at other positions inside the door, via the wires.

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14. (Previously Presented) A handle of a combination lock, wherein it comprises:

a handle body;

a handle base with the microcontroller and information display screen of said input device of the electronic combination lock described in Claim 10 installed therein, and a second window, which corresponds to said information display screen thereby the displayed contents may be viewed, is provided on the front face of the base; and

a panel, a roller device of the input device of the electronic combination lock as described in Claim 10 is installed inside the panel, a first window having the size and shape matching with that of the roller thereby said roller may be dialed and depressed is provided on the surface of said panel,

wherein said handle is hollow, and a cavity matching with the size and shape of said panel is provided on the front surface of the handle, thereby said panel can be embedded therein, and

said input device of the electronic combination lock is connected electrically with a combination identification device and a power supply of the combination lock which are installed inside the core mechanism of the lock or installed at other positions inside the door via the wires.

15. (Previously Presented) A panel of a combination lock for chests and bags, wherein the panel of the combination lock for the chests and bags is fixed on the external surface of the chest body, it comprises:

an input device of the electronic combination lock as described in Claim 10 installed within said panel;

a first window provided on the surface of said panel, which matches with the size and shape of said roller thereby said roller may be dialed and depressed; and

a second window provided on said panel, which matches with the size and shape of said information display screen and having a transparent window cover provided thereon thereby the displayed contents may be viewed,

wherein said input device of the combination lock is connected with a combination identification device and a power supply of the combination lock which are installed inside the chest body via the wires.

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16. (Currently Amended) A method for inputting a combination of a combination lock, comprising wherein it comprises the steps of:

a. receiving ~~[[the]]~~ rotation information of ~~[[the]]~~ a dial or roller via a signal device and converting it into two groups of electric pulse signals, said signal device ~~including a coder~~ comprising:

a panel body,

a rotatable dial installed on said panel body,

a drive shaft located at a center of said dial,

a set of driving gears installed on said drive shaft,

a driven gear engaged with said driving gears, and

a rotating coder coupled with said driven gear on the drive shaft;

b. measuring, deciding and calculating said two groups of electric pulse signals by a ~~measurement and control device~~ microcontroller, and further converting them into element sequence constituted by the combination;

c. displaying said character sequences including the combination elements and the preset information by ~~[[a]]~~ an information display device screen, wherein the rolling refresh rate for ~~displaying the character sequences including the code elements is a function of the signal~~ frequency of said two groups of electric pulse signals, the element sequence of the combination is rolling refreshed in an ascending order or descending order manner which corresponds to the rotation direction and angle of said dial or roller;

d. when the input of the current combination element is confirmed, a confirmation signal for inputting the combination element is produced by a ~~confirmation device~~ photoelectric switch, wherein ~~said confirmation device is a switch device~~, an electrical signal produced by said photoelectric switch when it is being closed allows said ~~measurement and control device~~ microcontroller to confirm the current combination element displayed by said information display device screen as a part of the input combination;

e. after said confirmation signal has been detected by the ~~measurement and control device~~ microcontroller, the input of the current combination element is confirmed; and

f. the ~~measurement and control device~~ microcontroller further decides whether the input of all the combination elements is completed or not,

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wherein said microcontroller, said coder, said information display screen and said photoelectric switch are provided on a same circuit board, said circuit board is provided within said panel body, and said microcontroller is connected electrically with said coder, said information display screen and said photoelectric switch, respectively.

17. (Currently Amended) The method for inputting a combination as described in Claim 16, wherein said method further comprises the following step: when a signal is produced by said ~~confirmation device~~ photoelectric switch, a given timing period is started, after that, whether the timing period expires or not is decided by the ~~measurement and control device~~ microcontroller, if the timing period expires, then it decides that the input is during overtime.

18-19. (Canceled)

20. (New) A method for inputting a combination of a combination lock, comprising:

a. receiving rotation information of a roller via a roller device and converting it into two groups of electric pulse signals, said roller device comprising:

a roller,

a coder which is coaxial with the roller, and

an elastic bracket for supporting said roller;

b. measuring, deciding and calculating said two groups of electric pulse signals by a programmed microcontroller, and further converting them into element sequence constituted by the combination;

c. displaying said character sequences including the combination elements and the preset information by an information display screen, wherein the rolling refresh rate for displaying the character sequences including the code elements is a function of the signal frequency of said two groups of electric pulse signals, the element sequence of the combination is rolling refreshed in an ascending order or descending order manner which corresponds to the rotation direction and angle of said dial or roller;

d. when the input of the current combination element is confirmed, a confirmation signal for inputting the combination element is produced by a microswitch provided below the shaft extension of the roller, wherein an electrical signal produced by said microswitch when being

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closed allows said microcontroller to confirm the current combination element displayed by said information display screen as a part of the input combination;

e. after said confirmation signal has been detected by the microcontroller, the input of the current combination element is confirmed; and

f. the microcontroller further decides whether the input of all the combination elements is completed or not,

wherein said microcontroller is connected electrically with said coder, information display screen and microswitch respectively.

21. (New) The method for inputting a combination as described in Claim 20, wherein said method further comprises the following step:

when a signal is produced by said microswitch, a given timing period is started, after that, whether the timing period expires or not is decided by the microcontroller, if the timing period expires, then it decides that the input is during overtime.
